

WHAT IS CLAIMED IS:

1. A conveying system, comprising:
a conveying member having friction resistant properties;
a support structure for supporting the conveying member;
a driving unit for generating a conveying motion, the driving unit being attached to the support structure;
at least one securing member for rigidly securing the conveying member to the support structure; and
at least one biasing member for allowing relative movement between the conveying member and the support structure along a first axis and for preventing relative movement between the conveying member and the support structure in any direction other than along the first axis,
wherein the driving unit is capable of producing a conveying motion in the conveying member to advance materials along the conveying member in the conveying direction.
2. A conveying system, according to claim 1, wherein the conveying member has a dynamic coefficient of friction on polished steel which is in a range of about 0.1 to 0.22.
3. A conveying system, according to claim 1, wherein the conveying member is a trough and the conveying direction is substantially parallel to a lengthwise direction of the trough.
4. A conveying system, according to claim 1, wherein the conveying member has anti-static properties.
5. A conveying system, according to claim 1, wherein the conveying member is made substantially from an ultra-high-molecular-weight polyethylene material.
6. A conveying system, according to claim 1, wherein the conveying motion is described by the function:

$$f(t)=2\sin(\omega_1 t)-\sin(2\omega_2 t)$$

wherein:

t = time;

ω_1 = an angular velocity of a first axis rotating about a second axis; and

ω_2 = an angular velocity of a first connection rotating about said first axis.

7. A conveying system, according to claim 1, wherein the conveying member has an aperture therethrough and the conveying system further comprises a door capable of covering the aperture for selectively allowing at least a portion of the materials to pass through the aperture.

8. A conveying system, according to claim 7, wherein the at least one securing member is disposed closer to the aperture than the at least one biasing member.

9. A conveying system, according to claim 7, wherein an edge of the aperture is beveled and an edge of the door, corresponding to the beveled edge of the aperture, is beveled to match the beveled edge of the aperture.

10. A conveying system, according to claim 7, further comprising an actuator for opening and closing the door with respect to the aperture.

11. A conveying system, according to claim 1, wherein the at least one biasing member comprises:

a first member affixed to the support structure, the first member having an opening therethrough;

a second member affixed to the support structure and spaced apart from the first member, the second member having an opening therethrough, the opening through the second member being aligned with the opening through the first member;

a flange affixed to the conveying member, the flange being disposed between the first member and the second member and having an opening therethrough, the opening through the flange being aligned with the opening through the first member and the opening through the second member,

a spring member disposed between the first member and the flange for urging the flange toward the second member, the spring member having an opening therethrough; and
a fastening member disposed through the openings in each of the first member, the spring member, the flange, and the second member for maintaining alignment of each of the openings in each of the first member, the spring member, the flange, and the second member.

12. A conveying system, according to claim 11, wherein the spring member is an elastomeric spring member.

13. A conveying member for use in a conveying system, the conveying member comprising:

a bottom portion on which materials are conveyed during a conveying operation; and
at least one wall portion for retaining the materials on the bottom portion during the conveying operation,

wherein the conveying member consists primarily of a material having friction resistant properties.

14. A conveying system, according to claim 13, wherein the conveying member has a dynamic coefficient of friction on polished steel which is in a range of about 0.1 to 0.22.

15. A conveying member, according to claim 13, wherein the conveying member has anti-static properties.

16. A conveying member, according to claim 13, made from an ultra-high-molecular-weight polyethylene material.

17. A conveying member, according to claim 13, having an aperture therethrough, the conveying member further comprising a door capable of covering the opening for selectively allowing at least a portion of the materials to pass through the aperture

18. A conveying member, according to claim 17, wherein said door is made substantially from an ultra-high-molecular-weight polyethylene material.

19. A conveying assembly comprising:
a conveying member which consists primarily of a material having friction resistant properties;

a support structure for supporting the conveying member;

at least one securing member for rigidly securing the conveying member to the support structure; and

at least one biasing member for allowing relative movement between the conveying member and the support structure along a first axis and for preventing relative movement between the conveying member and the support structure in any direction other than along the first axis.

20. A conveying system, according to claim 19, wherein the conveying member has a dynamic coefficient of friction on polished steel which is in a range of about 0.1 to 0.22.

21. A conveying assembly, according to claim 19, wherein the conveying member has anti-static properties.

22. A conveying assembly, according to claim 19, wherein the conveying member is a trough and the conveying direction is substantially parallel to a lengthwise direction of the trough.

23. A conveying assembly, according to claim 19, wherein the conveying member is made from an ultra-high-molecular-weight polyethylene material.

24. A conveying assembly, according to claim 19, wherein the conveying member has an aperture therethrough and the conveying assembly further comprises a door capable of covering the aperture for selectively allowing at least a portion of the materials to pass through the aperture.

25. A conveying assembly, according to claim 24, wherein the at least one securing member is disposed closer to the aperture than the at least one biasing member.

26. A conveying assembly, according to claim 24, wherein an edge of the aperture is beveled and an edge of the door, corresponding to the beveled edge of the aperture, is beveled to match the beveled edge of the aperture.

27. A conveying assembly, according to claim 24, further comprising an actuator for opening and closing the door with respect to the aperture.

28. A conveying assembly, according to claim 19, wherein the at least one biasing member comprises:

a first member affixed to the support structure, the first member having an opening therethrough;

a second member affixed to the support structure and spaced apart from the first member, the second member having an opening therethrough, the opening through the second member being aligned with the opening through the first member;

a flange affixed to the conveying member, the flange being disposed between the first member and the second member and having an opening therethrough, the opening through the flange being aligned with the opening through the first member and the opening through the second member;

a spring member disposed between the first member and the flange for urging the flange toward the second member, the spring member having an opening therethrough, and

a fastening member disposed through the openings in each of the first member, the spring member, the flange, and the second member for maintaining alignment of each of the openings in each of the first member, the spring member, the flange, and the second member.

29. A conveying assembly, according to claim 28, wherein the spring member is an elastomeric spring member.

30. A method of conveying materials, comprising the steps of:
providing a conveying member having antistatic properties; and

producing a conveying motion in the conveying member to advance the materials along the conveying member in the conveying direction.

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